

## GT100E MS Combiner Box for Master/Slave Configuration

**Owner's Manual** 

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## About This Manual

## Purpose

The purpose of this Owner's Manual is to provide explanations and procedures for installing and configuring the GT100E MS Combiner Box for Master/Slave Configuration.

## Scope

The Manual provides safety guidelines, procedures for installing the GT100E MS Combiner Box for Master/Slave Configuration, as well as information about configuring the combiner box. It does not provide details about the GT100E Grid Tie Inverter. You need to consult the GT100E Grid Tie Inverter Installation Manual (P/N 152364) and GT100E Grid Tie Inverter Operation, Maintenance and Troubleshooting Manual (P/N 152365) for this information.

## Audience

The Manual is intended for anyone who needs to install and operate the GT100E MS Combiner Box for Master/Slave Configuration. Installers should be certified technicians or electricians.

## Organization

This Manual is organized into three chapters:

Chapter 1, "Introduction", Chapter 1 contains a description of the GT100E MS and lists the different operating states available with the GT100E MS Combiner Box.

Chapter 2, "Installation", Chapter 2 contains procedures on how to mount the GT100E MS and make the cable connections.

Chapter 3, "Configuration", Chapter 3 describes how to configure the GT100E MS for Master/Slave configuration.

## **Conventions Used**

The following conventions are used in this guide.



## WARNING

Warnings identify conditions or practices that could result in personal injury or loss of life



## CAUTION

Cautions identify conditions or practices that could result in damage to the unit or other equipment.

**Important:** These notes describe things which are important for you to know, but not as serious as a caution or warning.

## **Related Information**

You can find more information about Xantrex Technology Inc. as well as its products and services at **www.xantrex.com** 

## **Important Safety Instructions**



## WARNING

This chapter contains important safety and operating instructions. Read and keep this Owner's Manual for future reference.

- 1. Before installing and using the GT100E MS Combiner Box for Master/Slave Configuration, read all instructions and cautionary markings on the GT100E MS Combiner Box for Master/Slave Configuration, GT100E Grid Tie Inverter, and all appropriate sections of this manual.
- 2. Use only attachments recommended or sold by the manufacturer. Doing otherwise may result in a risk of fire, electric shock, or injury to persons.
- 3. To avoid a risk of fire and electric shock, make sure that existing wiring is in good condition and that wire is not undersized. Do not operate the GT100E MS Combiner Box for Master/Slave Configuration with damaged or substandard wiring.
- 4. Do not operate the GT100E MS Combiner Box for Master/Slave Configuration if it has received a sharp blow, been dropped, or otherwise damaged in any way. If the GT100E MS Combiner Box for Master/Slave Configuration is damaged, see the Warranty section.
- 5. Do not disassemble the GT100E MS Combiner Box for Master/Slave Configuration. It contains no user-serviceable parts. See Warranty for instructions on obtaining service. Attempting to service the GT100E MS Combiner Box for Master/Slave Configuration yourself may result in a risk of electrical shock or fire. Internal capacitors remain charged after all power is disconnected.
- 6. To reduce the risk of electrical shock, disconnect both AC and DC power from the GT100E Grid Tie Inverter and the GT100E MS Combiner Box before attempting any maintenance or cleaning or working on any circuits connected to the GT100E MS Combiner Box for Master/Slave Configuration. Turning off controls will not reduce this risk.

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# 1

## Introduction

Chapter 1 contains a description of the GT100E MS and lists the different operating states available with the GT100E MS Combiner Box.

## **GT100E MS** Combiner Box

The GT100E MS combiner box, when installed with dual GT100Es, allows the GT100E Master/Slave configuration to maximize energy production during periods of low irradiance. A system would consist of two - 100kW inverters, one as the master and the other as a slave, and as a result, the GT100E system will run at greater than 94% efficiency above 20kW.

## Master/Slave Configuration

The Master/Slave configuration would be implemented on the DC side of the inverter. The configuration would feed multiple PV arrays into the Master inverter until the irradiance increases and the power reaches the high power threshold of the Master inverter. Once the power reaches the Master inverter's high power threshold, the inverter would shutdown and disconnect from the additional arrays. The Slave inverter would then be enabled and both the Master and the Slave inverter would power up and come on-line. See Figure 1-1 on page 1–4.

The GT100E inverters will have the ability to run in the master/slave configuration or the ability to run independently (stand-alone mode). The inverters will also have the ability to be configured as either the master (configured master) or the slave inverter (configured slave). The inverters also can be set to switch from operational master to operational slave daily.

## Difference between Configured Master/Slave and Operational Master/Slave

Through the front panel or the Xantrex Solar GUI (Graphical User Interface), the user configures an inverter to be either configured master or configured slave. Next, the user sets daily role reversal on or off.

If daily role reversal is off, then the configured master is the operational master (operates as master) and the configured slave is the operational slave (operates as slave).

If daily role reversal is on, then the configured master is operational master on odd days (January 1,3,5,...) and operational slave on even days (January 2,4,6,...).

If daily role reversal is on, then the configured slave is operational slave on odd days (January 1,3,5,...) and operational master on even days (January 2,4,6,...).

## Master Unit

The GT100E Master inverter will control the GT100E MS Combiner Box via a control cable. The Master inverter will enable and disable the Slave inverter, and monitor the status of the Slave inverter through an interconnect cable. If the interconnect cable is disconnected, the master will open the combiner box and go online.

## **Slave Unit**

The GT100E Slave inverter will monitor the status of the Master inverter through the interconnect cable. The inverter will be enabled from the Master inverter. If the interconnect cable is disconnected then the slave will go online.

## Master/Slave Operation States

The Master/Slave operation states will follow the standard states specified by the GT100E Grid Tie Inverter Operation, Maintenance and Troubleshooting Manual (P/N 152365) with the following Master/Salve configuration state.

- 1. At Power up, the Master inverter will disable the Slave inverter, and close the contactor in the GT100E MS Combiner Box.
- 2. The Master inverter will go online through the normal operating States. The Slave inverter will remain disabled.
- 3. When the Master inverter's power level increases, and reaches the High Power Threshold (configurable parameter). The Master inverter will shutdown, open the contactor in the GT100E MSCombiner Box, and the Master will also enable the Slave inverter.
- 4. Both the Master and Slave Inverters will go to an online state.
- 5. End of the Day or Cloud Interaction When the Master inverter's power level decreases, and reaches the Low Power Threshold and has maintained the power level for the Minimum Transition Seconds (configurable parameter). The Master and the Slave inverters will

shutdown. The Master inverter will disable the Slave inverter and close the contactor in the GT100E MS Combiner Box. The Master inverter will go online.

## **Fault Condition**

If the Master or Slave Inverter gets a fault or the status signal from either inverter is lost, the inverters will shutdown and restart as stand alone inverters.

## **Mis-configuration of Units**

If the Master or Slave Inverter are mis-configured by the operator, the inverters run as stand alone inverters.

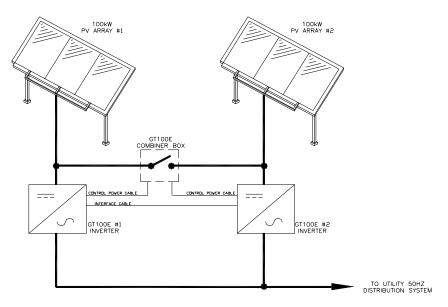


Figure 1-1 Configuration Diagram



## Installation

Chapter 2 contains procedures on how to mount the GT100E MS and make the cable connections.

## **Equipment Required**

- Ratchet Handle
- Extension
- Metric socket set
- Metric wrench set
- Metric hex wrench set
- Torque wrench with 0-150Nm minimum range
- Phillips Screwdriver

## Unpacking the GT100E MS



## WARNING: Equipment is Heavy

The GT100E MS combiner box weighs 82 Kg.

### To unpack the GT100E MS from the shipping pallet:

- 1. Remove the packing material from the MS100E.
- 2. Open the GT100E MS Combiner Box.
- 3. Remove the 8 M6 screws holding the safety cover from the box.
- 4. Remove the box containing GT100E MS interface assemblies.
- 5. Remove the manual.
- 6. Remove the GT100E MS combiner box power cable assembly P/N 1-152492-01
- 7. Remove the GT100E MS combiner box interface cable assembly P/N 1-152493-01
- 8. Remove all mounting hardware from the box.
- 9. Remove the GT100E MS Combiner Box from the pallet.



Figure 2-1 GT100E MS Componenets

## **Mounting Instructions**

#### To mount the MS100E combiner box onto a wall:

1. Install the 4 wall mounting brackets P/N 062-2000-02 to the rear of the MS100E Combiner box, see Figure 2-2.

**Important:** The GT100E MS Combiner box needs to be mounted with in 8 meters of the GT100E units.

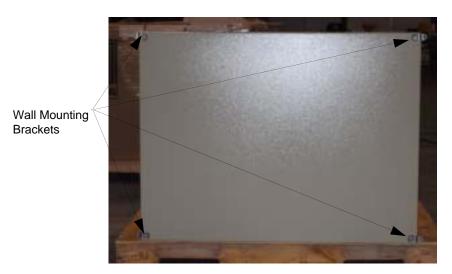


Figure 2-2 Wall Mounting Bracket Locations

2. Anchor the GT100E MS combiner box to the wall using anchor bolts.

## Cable Installation



## CAUTION

All wiring methods and wire gauges shall be in accordance with Local Electrical Code. Take care to keep the wire bundles away from any sharp edges which may damage wire insulation over time.

## Wire Gauge and Torque Specifications

The following torque specifications are to be used on all electrical interfaces made during installation of the GT100E MS Combiner Box.

### Wire Gauge Requirements for the GT100E MS Combiner Box

One or multiple wires up to 300 mm2 can be connected to the GT100E MS Combiner box. Follow local Electrical codes to determine the correct wire gauge.

### Torque Specifications for the GT100E MS Combiner Box

M10 Bolt	40.0Nm
M12 Bolt	54.0Nm
M16 Bolt	132.0Nm

## **MS100E** Connections

Use the following descriptions and figures to correctly identify access panels and route wiring.

### **Input/Output Access Panels**

Install all the cable strain reliefs, customer supplied, needed for cable entry in both Access Panels, see Figure 2-3.



Figure 2-3 Input/Output Access Panel Location

## PV Array and GT100E Connections

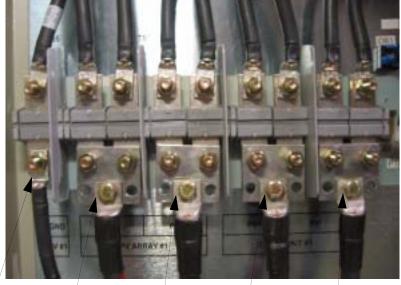


PV ARRAY #1 and GT100E #1 Connections PV ARRAY #2 and GT100E #2 Connections

Figure 2-4 PV Array and GT100E Connections

#### To make PV Array #1 and GT100E #1 connections:

- Route the PV Array #1 cables through the access panel and connect the cables to PV ARRAY #1 PV(+) and PV(-) terminals, see Figure 2-5.
- Route the GT100E #1 cables through the access panel and connect the cables to GT100E #1 PV(+) UNIT and PV(-) terminals, see Figure 2-5.
- 3. Route the PV Array #1 ground cable through the access panel and connect the cable to PV ARRAY #1 GND terminal, see Figure 2-5.

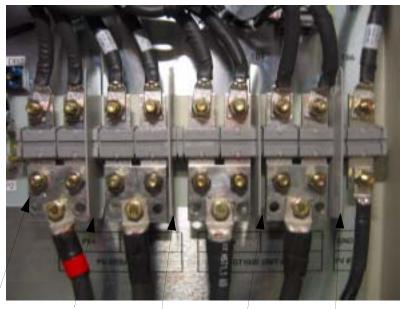


Combiner BoxCombiner BoxCombiner BoxCombiner BoxPV ARRAY #1PV ARRAY #1PV ARRAY #1GT100E #1GT100E #1GND TerminalPV (+) TerminalPV (-) TerminalPV (+) TerminalPV (-) Terminal

Figure 2-5 PV Array #1 and GT100E #1 Connections

#### To make PV Array #2 and GT100E #2 connections:

- Route the GT100E #2 cables through the access panel and connect the cables to GT100E UNIT #2 PV(+) and PV(-) terminals, see Figure 2-6.
- Route the PV Array #2 cables through the access panel and connect the cables to PV ARRAY #2 PV(+) and PV(-) terminals, see Figure 2-6.
- 3. Route the PV Array #2 ground cable through the access panel and connect the cable to PV ARRAY #2 GND terminal see Figure 2-6.



Combiner BoxCombiner BoxCombiner BoxCombiner BoxPV ARRAY #2PV ARRAY #2GT100E #2GT100E #2PV (+) TerminalPV (-) TerminalPV (+) TerminalPV (-) Terminal

Combiner Box PV ARRAY #2 GND Terminal

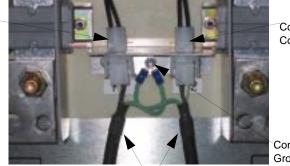
Figure 2-6 PV Array #2 and GT100E #2 Connections

#### **GT100E MS Control Power Cable**

#### To make GT100E MS Control Power Cable connections:

- 1. Connect the GT100E MS combiner box power cable assembly P/N 1-152492-01 from the GT100E #1 through the access panel and connect it to P1, see Figure 2-7.
- 2. Connect the GT100E MS combiner box power cable assembly P/N 1-152492-01 from the GT100E #2 through the access panel and connect it to P2, see Figure 2-7.
- 3. Connect the Cables ground wires to the ground terminal using a M5 nut.

Combiner Box Connector P1



Combiner Box Connector P2

Combiner Box Ground Terminal

GT100E MS Combiner Box Power Cable Assembly P/N 1-

Figure 2-7 GT100E MS Power Control Cable Connections

4. Reinstall the safety cover into the GT100E MS Combiner box using 8 M6 screws.

## MS100E Interface Assembly Installation for GT100E #1 Mounting Instructions

The GT100E MS Interface is located in the bottom right compartment of the GT100E. See Figure 2-8.



Figure 2-8 Location of GT100E MS in the GT100E

#### To install the GT100E MS Interface Assembly:

1. Mount the MS100E Interface Assembly to the Customer Interface Rail using the 4 supplied Torx screws P/N 1-152173-01. See Figure 2-9.



GT100E MS Interface Assembly

Figure 2-9 GT100E MS Interface Assembly Installation

#### To install the MS100E Interface Assembly Cable:

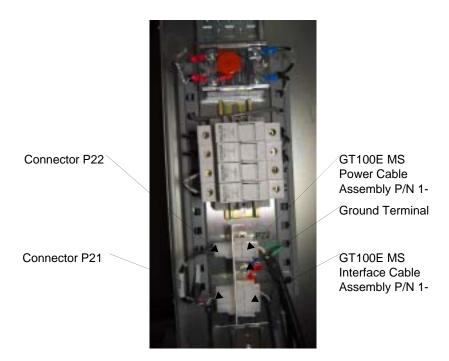
1. Connect the MS100E Interface Assembly cable J20 to the GT100E Option Panel P20, located at the bottom/rear of the cabinet, see Figure 2-10.





### To install the MS100E Control Power and Interface Cable:

- 1. Route the MS100E Power Cable assembly P/N 1-152492-01 and MS100E Interface cable assembly P/N 1-152493-01 through the Input/Output Access Base Panel on the GT100E unit. Reference the GT100E Planning and Installation Manual P/N 152364
- 2. Connect the MS100E Power cable assembly to the MS100E Interface Assembly connector P22, see Figure 2-11.
- 3. Connect the MS100E Interface cable assembly to the MS100E Interface Assembly connector P21, see Figure 2-11.
- 4. Connect both of the cable ground wires to the ground terminal using a M5 nut, see Figure 2-11.





#### To install the MS100E Interface Assembly for GT100E #2:

1. Repeat the MS100E Interface Assembly Instructions for GT100E for the second GT100E unit - GT100E #2.

## **GT100E Unit Installation**

To install the GT100E refer to the GT100E Grid Tie Inverter Installation Manual (P/N 152364).

For GT100E commissioning or Turn-On Procedure refer to the GT100E Grid Tie Inverter Operation, Maintenance and Troubleshooting Manual (P/N 152365).



## Configuration

Chapter 3 describes how to configure the GT100E MS for Master/Slave configuration.

## Master/Slave Configuration

The Master/Slave system can be configured through the Xantrex Solar GUI (Graphical User Interface) software, P/N 1-152577-01, or through the Operator Interface Panel.

Establish remote or local communication with the GT100E, using the Xantrex Solar GUI software.

#### To set a unit up as the Master Unit:

- 1. Click Tools > Inverter Data > Operational Configuration
- 2. Check the Configured Master check box

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- 3. Click Send Configuration
- 4. Verify that the Present Inverter Data has the unit set as the Configured Master unit.

**Important:** If the inverter's date (not the workstation's!) is odd then the Inverter is OPERATIONAL MASTER until midnight; if the inverter's date is even, the Inverter is OPERATIONAL SLAVE until midnight.

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#### To set a unit up as the Slave Unit:

- 1. Click Tools > Inverter Data > Operational Configuration
- 2. Check the Configured Master check box

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- 3. Click Send Configuration
- 4. Verify that the Present Inverter Data has the unit set as the Configured Slave unit.

**Important:** If the inverter's date (not the workstation's!) is odd then the Inverter is OPERATIONAL SLAVE until midnight; if the date is even, the Inverter is OPERATIONAL MASTER until midnight.

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## CAUTION

The Master/Slave configuration will only be activated after power is cycled on the unit.

**Important:** Verify that the date is the same on both the GT100E #1 and GT100E #2. This will allow the daily role reversal option to function correctly.

Refer to the GUI Help menu for complete configuration instructions.

## Warranty and Product Information

## **Limited Warranty**

#### 1.1 What does this warranty cover and how long does it last?

This Limited Warranty is provided by Xantrex Technology Inc. ("Xantrex") and covers defects in quality in workmanship and materials ("Defects") in your GT100E MS Combiner Box for Master/Slave Configuration. This warranty lasts for a period of 2 years (the "Warranty Period") from the date of commissioning indicated on the product warranty registration form submitted to Xantrex.

#### 1.2 What will Xantrex do?

If there is a Defect, Xantrex will repair or replace the defective product free of charge, provided that:

- a. you have followed the procedure at 1.3 and not been able to get a remedy from the system integrator of the product;
- b) you notify Xantrex, without undue delay, of the Defect within the Warranty Period; and
- c) Xantrex, through inspection, troubleshooting, or other means establishes the existence of a Defect that it is covered by this Limited Warranty.

Xantrex will, at its option, use new and/or reconditioned parts in performing warranty repair and building replacement products. Xantrex reserves the right to use parts or products of original or improved design in the repair or replacement. If Xantrex repairs or replaces a product, the warranty is suspended during the repair or replacement and continues for the remaining portion of the original Warranty Period or 90 days from the date of the completed repair activity, whichever is greater. All replaced products and all parts removed from repaired products become the property of Xantrex.

Xantrex covers both parts and labour necessary to repair the product. If the product was sold in Spain, Xantrex will cover costs via a Xantrex-selected non-expedited surface freight and packing.

#### 1.3 How do you get service?

If you are unable to contact your system integrator. If the system integrator is unable to provide service, contact Xantrex directly at the following numbers:

GERMANY	
Telephone:	49 0180 2240400
Fax:	49 (0) 7531 8199868
Email	GTsupport.Germany@xantrex.com
SPAIN	
Telephone:	34 935 560 976
Fax:	34 934 736 093
Email	GTsupport.Spain@xantrex.com

#### 1.4 What does this warranty not cover?

This Limited Warranty does not cover normal wear and tear of the product or costs associated with replacing consumable items such as like air filter, fuses, arrestors etc. A shorter than normal life during the Warranty Period caused by excessive use, or incorrect use not considered a Defect. Please consult your Owner's Manual to determine the proper use of the product.

This warranty does not apply to and Xantrex will not be responsible for any damage to the product:

- a. if it has not been used in accordance with the Owner's Manual supplied with the product, if it has been damaged during shipping, mishandled, neglected, improperly installed, physically damaged or altered (either internally or externally) or damaged from improper use or use in an unsuitable environment;
- b) if it has been subjected to fire, water, generalized corrosion, biological infestations, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Xantrex product specifications including high input voltage from generators and lightning strikes;
- c) if repairs have been done to it other than by Xantrex or an Authorized Service Center;
- d) if it is used as a component part of a product expressly warranted by another manufacturer; and
- e) if its original identification (trade-mark, serial number) markings have been defaced, altered, or removed.

#### 1.5 Exclusions

This Limited Warranty is the sole and exclusive warranty provided by Xantrex in connection with your Xantrex product and is, where permitted by law, in lieu of all other warranties, conditions, guarantees, representations, obligations and liabilities, express or implied, statutory or otherwise in connection with the product, however arising (whether by contract, tort, negligence, principles of manufacturer's liability, operation of law, conduct, statement or otherwise) including without restriction any implied warranty or condition of quality, merchantability or fitness for a particular purpose. Any implied warranty of merchantability or fitness for a particular purpose to the extent required under applicable law to apply to the product shall, where permitted by law, be limited in duration to the period stipulated under this Limited Warranty.

In no event will Xantrex be liable for any special, indirect, incidental or consequential damages, losses, costs or expenses however arising whether in contract or tort including, without restriction, any economic losses of any kind, any loss or damage to property, or any damage or injury arising from or as a result of misuse or abuse or the incorrect installation, integration or operation of the product.

#### **1.6 Limitations on Exclusions**

This Limited Warranty does not affect your rights as prescribed by law and as established in the Law on Warranties for Consumer Goods (Spain) or the German Civil Code ("BGB"). In Germany, the legal provisions regarding suspension or expiration ("Ablaufhemmung"), suspension ("Hemmung") and recommencement of limitation periods remains unaffected.

Some countries do not allow limitations or exclusions on implied warranties or on the duration of an implied warranty or on the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply to you.

For example, in Germany, the exclusion at 1.5 shall not apply in the case of mandatory liability, i.e. under the German Product Liability Act ("Produkthaftungsgesetz") or in the case of intent, gross negligence, and injury of life, body or health, or breach of a condition which goes to the root of the contract ("wesentliche Vertragspflichten"). However, claims for damages arising from a breach of a condition which goes to the root of the contract shall be limited to the foreseeable damage which is intrinsic to the contract, unless caused by intent or gross negligence or based on liability for injury of life, body or health. The exclusion at 1.5 in Germany also does not imply a change in the burden of proof to your detriment.

#### **1.7 Exclusion for Documentation**

Without limiting the generality of the foregoing, unless specifically agreed to by it in writing, Xantrex:

- a. makes no warranty as to the accuracy, sufficiency or suitability of any technical or other information provided in manuals or other documentation provided by it in connection with the product; and
- b) assumes no responsibility or liability for losses, damages, costs or expenses, whether special, direct, indirect, consequential or incidental, which might arise out of the use of such information.

The use of any such information will be entirely at the user's risk.

#### 1.8 WARNING: LIMITATIONS ON USE

Please refer to your Owner's Manual for limitations on uses of the product. Specifically, please note that the GT100E MS Combiner Box for Master/Slave Configuration is not intended for use in connection with life support systems or other medical equipment or devices and Xantrex makes no representation or warranty in connection with any use of the product for such purposes.

Xantrex Technology Inc. 8999 Nelson Way Burnaby, British Columbia Canada V5A 4B5

## **Out of Warranty Service**

If the warranty period for your GT100E MS Combiner Box for Master/Slave Configuration has expired, if the unit was damaged by misuse or incorrect installation, if other conditions of the warranty have not been met, or if no dated proof of purchase is available, your unit may be serviced, repaired or replaced for applicable charges.

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